

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Door Control Mechanism

I, LISLE WILLIAM MENZIMER, a Citizen of the United States of America, of Faust Hotel, 630, East State Street, Rockford, State of Illinois, United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to door control mechanism of the co-operating keeper and pivoted latch type and provides a novel construction of a very practical form for door control mechanism of this kind and by reason of which the mechanism is especially suitable for vehicle door use.

According to the present invention there is provided a door control mechanism comprising: a support adapted for mounting on a door; latch means pivoted on said support and movable to and from a door-latched position; detent means effective on said latch means for releasably retaining the latter in said door-latched position and including a swingable first arm; a detent release member pivoted on said support and including a swingable second arm adjacent said first arm; a locking member shiftable mounted on said support for movement to locking and unlocking positions; and control means connected with said locking member and having a control portion extending transversely to one of said arms; said control means being shiftable by said locking member for moving said control portion to effective and ineffective control positions; said detent release member having an idle movement relative to said detent means when said control portion is in said ineffective position and the other of said arms being engageable with said control portion, when the latter is in said effective position, for rendering said detent means actuated by said detent release member.

In the accompanying drawings forming a part of this specification,

Fig. 1 is a partial side elevation of a vehicle body showing the control mechanism of this invention applied to one of the doors thereof;

Fig. 2 is a partial elevational view of the upright edge wall of the door having the latch device of the control mechanism mounted thereon;

Fig. 3 is a partial transverse vertical section taken approximately as indicated by section line 3—3 of Fig. 1 and showing the keeper and the upright edge wall portion of the doorframe mainly in elevation;

Fig. 4 is a vertical axial section taken through the control mechanism as indicated by section line 4—4 of Figs. 2, 3 and 5 and showing the relationship of the parts when the door is in a latched and locked condition.

Fig. 5 is a fragmentary transverse vertical section of the latch device taken on section line 5—5 of Figs. 4 and 7 with the parts again shown in the door-latched and door-locked position;

Fig. 6 is a fragmentary section like that of Fig. 5 but showing the relationship of the parts for the door-unlocked and door-unlatched condition of the mechanism;

Fig. 7 is a vertical axial section taken on section line 7—7 of Figs. 6 and 8;

Fig. 8 is a sectional plan view taken through the latch device at the location indicated by section line 8—8 of Figs. 5 and 7 and showing the parts in the door-unlocked position;

Figs. 9 and 10 are fragmentary elevational views on a larger scale and of a diagrammatic form and illustrating the action of the over-center spring of the locking lever;

Figs. 11 to 14 inclusive are of a modified form of door control mechanism, Fig. 11 being a fragmentary transverse vertical section similar to Fig. 5 but taken on section line 11—11 of Fig. 13 and showing the latch device in a door-latched and door-locked condition;

Fig. 12 is a fragmentary transverse vertical

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section like that of Fig. 11 but showing the latch device in a safety-latched condition;

Fig. 13 is a vertical section taken on section line 13—13 of Figs. 11 and 14; and

5 Fig. 14 is a sectional plan view taken on section line 14—14 of Figs. 11 and 13 and showing the parts in the door-locked position.

10 In the accompanying drawings the door control mechanism 10 is shown applied to co-operating door and doorframe members 11 and 12 of a vehicle body 13 and comprises a keeper 14 mounted on the doorframe and a latch device 15 co-operating therewith and mounted on the door.

15 The door 11 can be of any conventional form and is here shown as being a swingable door connected with the vehicle body 13 as by the usual vertical-axis hinge means and having outer and inner side walls 17 and 18 and a chamber or space 19 between such walls. 20 The door 11 has a free edge portion 20 provided with an upright edge wall 21 which is presented toward the pillar portion 22 of the doorframe 13 when the door is in its closed position.

25 The doorframe 12 is here represented by the upright pillar portion 22 which has an edge wall 23 lying in an opposite relation to the edge wall 21 of the door when the door is in its closed position so that the opposed upright edge walls co-operate to form a cleavage crevice 24 and lie on opposite sides of an upright cleavage plane extending transversely of the vehicle. The edge wall 23 is provided with a rearwardly offset recess or indentation 25 to accommodate the keeper 14.

30 The latch device 15 will be described in detail hereinafter but, at this point, it is explained that the latch device is mounted on the edge wall 21 of the door 11 and includes a pivot shaft 27 projecting through an opening 28 of such wall and a latch member 29 pivotally supported by such shaft. The latch device 15 also includes a roller 30 pivotally supported by the shaft 27 and mounted thereon immediately adjacent the latch member 29 and in which position the roller is retained by a projecting bracket arm 31 having the outer end of the shaft 27 supported thereon. 45 The latch member 29 is here shown as having a body portion formed integral with the shaft 27 and as also having a plurality of teeth 32 formed on such body portion, in this case two such teeth 32^a and 32^b.

50 The keeper 14 can be of any appropriate shape and construction for co-operation with the latch member 29 and the roller 30 and is here shown as being in the form of a hollow body 34 having a recess 35 in the rear side thereof and presented toward the edge wall 23 of the doorframe 12 to which the keeper is secured by suitable attaching screws 36. The keeper body 34 is provided with a front wall 37 having a notch 38 therein to accommodate 65 the shaft 27 when the door is moved to its

closed position. The keeper body 34 is also provided with upper and lower lug projections 40 and 41 through which attaching screws 36 extend.

The keeper body 34 also has a peripheral 70 edge wall 39 connected with the front wall 37 and extending rearwardly therefrom. The wall 39 extends around the keeper body for the major portion of the perimeter thereof but is interrupted by an access opening 43 located 75 on the side of the keeper facing outwardly of the vehicle and which access opening leads into, and communicates with, the keeper recess 35 as well as with the notch 38.

80 The keeper recess 35 is of a size and shape to freely receive the roller 30 when the door is moved to its closed position and the notch 38 is of a size and shape to receive the latch member 29. The portion of the front wall 37 which is located below the notch 38 is 85 provided with a latching pocket 44 which communicates with the notch and is of a size and shape to mate with and receive one of the teeth 32 of the latch member. The pocket 44 is centered on a substantially vertical center line 45 which extends through the pivot axis 46 of the shaft 27 when the door is closed and the latch member 29 is in a door-latched position in the keeper 14 in 90 which position the latch member is shown in full lines in Fig. 3 with the tooth 32^a as the pocket-engaged tooth. 95

The portion of the keeper wall 37 lying on the outwardly facing side of the keeper at a point below the notch 38 forms a striker means 100 48 against which the next adjacent tooth 32^b of the latch member engages as the door approaches its closed position. This engagement causes the tooth 32^a to be swung into the pocket 44 as the door 11 moves to its fully 105 closed and door-latched position shown in Figs. 3 and 4.

The roller 30 is of a diameter substantially greater than the transverse dimension of the notch 38 so that, when the door 11 is in its 110 door-latched position, portions of the roller will lie behind the front wall 37 and will be engageable with the latter at points located on opposite sides of the notch to thereby prevent spreading apart of the door and doorframe in the fore-and-aft direction in the event that the vehicle is involved in a collision. 115 When the door is in its door-latched position the lower portion of the roller 30 is spaced from the edge wall 39 of the keeper body, as shown in Figs. 3 and 4, so that the tooth 32^a of the latch member 29 will seat in the pocket 44 to support the door in an antirattle relation to the doorframe 12. 120

The portion of the edge wall 39 of the 125 keeper body lying at the lower edge of the access opening 43 provides a lower guide means 50 which is engageable by the roller 30 to facilitate the movement of the latch member 29 into the keeper 14 to its door-latched 130

position therein. A portion of the edge wall 39 of the keeper which is located on the upper side of the access opening 43 forms a similar upper guide means 51 which will be engageable by the roller 30 in the event that the keeper and latch member are in a relatively misaligned relation.

In Fig. 3 of the drawings the phantom-line showings of the roller 30 represent misaligned positions 30^a and 30^b thereof. These phantom-line positions 30^a and 30^b are somewhat exaggerated misalignment positions for the roller which would cause the same to engage the lower and upper guide elements 50 and 51, respectively, and thereby produce a corrective shifting of the door which would enable the latch member and roller to readily enter the keeper 14. The roller 30 will, of course, also co-operate under similar circumstances with one or the other of the guide elements 50 and 51 to facilitate movement of the latch member 29 out of the keeper recess 35 during opening movement of the door. The phantom-line position 30^c represents the normal approach position of the roller 30 and the normal approach position 29^a of the latch member, relative to the keeper 14.

The keeper body 34 is also provided with a pocket 52 which is located above the notch 38 and the recess 35 and communicates with the latter. A wedge member 53 is located in the pocket 52 and is engageable by the upper peripheral portion of the roller 30 for producing a door-holding or door-supporting co-operation therebetween and for also urging the engaged tooth 32^a of the latch member downwardly in the pocket 44 into seating engagement with the wall of the latter.

The wedge member 53 is swingably supported in the pocket 52 by a pivot pin 54 mounted on the front wall 37 and extending rearwardly therefrom. A wire spring 55 also mounted on the pivot pin 54 is effective against the wedge member 53 for swinging the same in a direction to press the thrust portion 53^a thereof against the periphery of the roller 30.

The latch device 15 comprises a support 57 having plate and flange portions 58 and 59 disposed in a substantially right-angular relation to each other. The plate portion 58 is adapted to be attached to the edge wall 21 of the door 11 by means of suitable screws 60 for mounting the latch device 15 on the door. The plate portion 58 is provided with a sleeved opening having a bushing 61 mounted therein for pivotally supporting the shaft 27.

The latch device 15 also comprises a ratchet member 63 which together with the latch member 29 comprises latch means. Ratchet member 63 is fixed on the pivot shaft 27 and has teeth 63^a, 63^b and 63^c with which a detent means 64 co-operates for holding the latch member 29 in the different positions

to which it is movable. The detent means 64 comprises a detent lever 65. There is also provided a detent release lever 66. The levers 65 and 66 are swingably supported by a common pivot pin 67 mounted in the plate portion 58 of the support 57.

The detent lever 65 is in the form of a bell crank lever comprising a detent arm 68 and a control arm 69, the detent arm having, on the free end thereof, a hook-shaped holding portion 68^a which is co-operable with the teeth of the ratchet member 63. The tooth 63^a is engageable by the holding portion 68^a when the latch member 29 is in its door-latched position and such engagement of this tooth by the holding portion will retain the latch member in the door-latched position.

When the tooth 63^b of the ratchet member 63 is in engagement with the holding portion 68^a, the latch member 29 will be retained in its safety-latched position in which the tooth 32^a of the latch member extends only part-way into the pocket 44. This safety-latched position of the latch member is the phantom-line position 29^b thereof shown in Fig. 3. When the tooth 63^c of the ratchet member 63 is in engagement with the holding portion 68^a, as shown in Fig. 6 of the drawings, the latch member 29 will be in its door-unlatched position.

The detent release lever 66 is also in the form of a bell crank lever having an actuator arm 71 and a control arm 72. The actuator arm 71 has a contact portion or flange 71^a which is engageable by the stem 73 of a push button 74 provided on the door 11 and forming an outside control means for the door control mechanism 10. For a purpose to be explained hereinafter, the control arm 72 lies adjacent the control arm 69 of the detent lever 65 and extends in a substantially parallel relation thereto. The flange 71^a of the detent release lever 66 is of a length so that the lower end thereof extends below the axis of the pivot pin 67 to form a thrust portion 75 which overlaps and is engageable with the adjacent edge of the detent arm 68.

As an important part thereof the latch device 15 also comprises a control member 78 for establishing an operative and releasable connection between the detent release lever 66 and the detent lever 65 so that the latter lever will be actuatable to release the ratchet member 63 in response to swinging of the release lever by the push button 74. The control member 78 is here shown as being in the form of a T-shaped member having a stem portion 78^a and a transverse bar portion 78^b rigidly connected with such stem portion. The ends of the bar portion 78^b form oppositely extending fingers 79 and 80.

The latch device 15 also comprises a locking member in the form of a lever 81 lying adjacent the flange portion 59 of the support 57 and swingably supported by a pivot pin

82 mounted in such flange portion. The form of the locking lever 81 and the manner of its co-operation with the detent means 64 will be described in detail hereinafter. The control member 78 is connected between the detent means 64 and the locking lever 81 and for this purpose, the detent lever 65 is provided with a support bracket 84 and the locking lever is provided with an actuating bracket 85.

The support bracket 84 is an L-shaped member having one end thereof attached to the control arm 69 by a riveted connection 86 and whose other end forms a support arm 84^a which is provided with an opening 87 and whose free end extends into a slot 88 of the flange portion 59. It will be seen that the support arm 84^a extends in a parallel relation to the free end portion of the control arm 69 and is spaced therefrom so that the opening 87 is in a substantially opposed and laterally aligned relation to a similar opening 89 provided in this control arm.

The control member 78 is positioned relative to the detent means 64 so that the stem portion 78^a lies between the support arm 84^a and the control arm 69, as shown in Fig. 7, and the oppositely extending fingers 79 and 80 project through the openings 87 and 89 respectively. The control member 78 is assembled in this relation to the control arm 69 and the support arm 84^a prior to the forming of the riveted connection 86. When the control member is disposed in this relation, the stem 78^a thereof extends in a depending relation and projects toward the pivot pin 82 on which the locking lever 81 is swingably mounted.

The stem portion 78^a of the control member 78 is loosely and slidably received in an opening 91 of the actuating bracket 85. This actuating bracket can, if desired, be a lug projection formed on the locking lever 81 but is here shown as being a separate part lying alongside the locking lever and held thereagainst by the head 82^a of the pivot pin 82. The actuating bracket 85 is also connected with the locking lever 81 so as to be swingable therewith by means of a lug portion 92 projecting into an opening of the locking lever.

The aligned openings 87 and 89 of the detent means 64 are of a size in relation to the fingers 80 and 79 of the control member 78 so that these fingers will be slidable in an endwise direction in these openings upon shifting of the control member transversely of the detent means by the swinging of the locking lever 81. The finger 79 is of a length so that when the locking lever 81 is swung to its unlocking position in which it is illustrated in full lines in Fig. 7, this finger will extend into the path of the swinging movement of the control arm 72 of the detent release lever 66 as shown in Fig. 8. The

plate portion 58 is provided with a clearance opening 90 into which the free end of the finger 79 can project when it is in its extended effective position.

When the locking lever 81 is in its locking position 81^a, the finger 79 is in a relatively retracted position which permits an idle swinging of the control arm 72 without coming into engagement with this finger. However, when the finger 79 is in the extended position mentioned just above and shown in Fig. 8, it will be engageable by the control arm 72 so that downward swinging imparted to this control arm by the action of the push button 74 will cause a corresponding downward swinging of the control arm 69 by which the holding portion 68^a of the detent lever 65 will be disengaged from the ratchet member 63.

It will therefore be seen that whenever the locking lever 81 is in its locking position 81^a, the finger 79 of the control member 78 will be in its retracted ineffective position and the detent release lever 66 will then have an idle free-wheeling movement on the pivot pin 67 and the detent lever 65 will remain in the position with the holding portion 68^a in engagement with the tooth 63^a of the ratchet member 63 for retaining the latch member 29 in a door-latched and door-locked position. However, when the locking lever 81 is in its unlocking position, the finger 79 will be in its extended effective position in which it will be engageable by an edge portion of the control arm 72 whereupon swinging movement imparted to the detent release lever 66 by the push button 74 will cause a simultaneous swinging of the detent lever 65 in a direction to cause the holding portion 68^a thereof to release the ratchet tooth 63^a to permit the latch member 29 to move from its door-latched position to its door-unlatched position.

The locking lever 81 is provided at the upper end thereof with cam and shoulder portions 93 and 94 lying above and below a notch 95 formed in the edge of this lever. The notch 95 is of a size and shape to receive the support arm 84^a of the detent lever 65 when the locking lever is swung to its locking position 81^a. When the locking lever is in such locking position, the shoulder portion 94 will be located immediately below the support arm 84^a so as to be engageable by the latter as a blocking means for preventing the downward swinging of the control arm 69 which is necessary for disengagement of the holding portion 68^a of the detent lever 65 from the tooth 63^a of the ratchet member 63.

Thus, when the locking lever 81 is in its locking position and the finger 79 of the control member 78 has been retracted so that the swinging of the detent release lever 66 by the push button 74 will be only an idle free-wheeling movement, the blocking shoulder 94 will, at this time, be engageable by the sup-

port arm 84^a to positively retain the control arm 69 against any downward ratchet-releasing swinging movement. This blocking action by the shoulder portion 94 of the locking lever thus prevents any unintentional or accidental ratchet-releasing actuation of the detent lever 65 by the idle free-wheeling movement of the detent release lever 66 as the result of the presence of dirt, rust, ice or other such foreign matter, between the levers 65 and 66.

The outside control means provided on the door 11 comprises, in addition to the push button 74, a key-actuatable conventional cylinder lock 97 having the usual noncircular spindle 98 extending therefrom and engaged in a noncircular opening of a locking finger 99 pivotally mounted on the flange portion 59 of the support 57. The locking finger 99 has the free end thereof received in a C-shaped opening 100 of the locking lever 81 for co-operative thrust engagement with cam portions 101 and 102 provided on the locking lever on opposite sides of the C-shaped opening 100. The C-shaped opening 100 and the associated cam portions 101 and 102 are formed on the locking lever 81 so as to lie below the pivot pin 82, whereby swinging of the locking finger 99 into thrust engagement with the cam portion 100 will move the locking lever to its locking position and thrust engagement of the locking finger with the cam portion 102 will swing the locking lever to its unlocking position.

The latch device 15 is also provided with inside control means comprising an unlocking lever 104 swingably mounted on a pivot pin projection 105 of the flange portion 59 and a push-pull link 106 having a knob or the like 107 located adjacent the garnish molding 108 of the vehicle door 11. The unlocking lever 104 is connected with an inside control handle of the vehicle door 11, by a link 109, and is swingable by the latter in a clockwise direction on the pivot pin 105 to co-operate with the cam portion 93 of the locking lever 81 for swinging the latter to its unlocking position. Further clockwise movement of lever 104 causes same to engage and move support arm 84^a downwardly for causing disengagement of the holding portion 68^a of the detent lever 65 from the tooth 63^a of the ratchet member 63. The garnish molding knob 107 is connected with the locking lever by the push-pull link 106 to enable the locking lever to be swung to and from its locking position by manual actuation of the knob.

A single spring means 111 is provided to serve the levers 65 and 66 and the latch member 29. This spring means is here shown as being a tension spring having the end 111^a thereof attached to the thrust portion 75 of the detent release lever 66 and having its opposite end 111^b attached to an anchor member

112 which is fixed on the shaft 27 and swingable thereby. When the spring 111 is thus connected between the thrust portion 75 and the anchor member 112, it will continuously apply a clockwise rotative force to the latch member 29 and to the levers 65 and 66.

This action of the spring 111 on the lever 66 will impart a return swinging movement thereto and, through the thrust action of the thrust portion 75 against the detent arm 68, will also urge the latter toward engagement with the teeth of the ratchet member 63. The pulling force of the spring 111 on the anchor member 112 will likewise tend to cause clockwise rotation of the shaft 27 for producing a throw-out action of the latch member 29 against the keeper 14 when the ratchet member 63 is released by the holding portion 68^a.

The movement of the locking lever 81 to its locking and unlocking positions is produced, in part, by an over-center type of spring 114 (see Figs. 9 and 10) which is connected between this lever and the flange portion 59. The spring 114 is here shown as being a wire spring of a flat circular form having anchor portions 115 and 116 formed by the ends of the spring wire and which anchor portions extend in opposite directions axially of the spring.

The anchor portion 115 is engaged in a hole 117 provided in the locking lever 81 and the anchor portion 116 is engaged in one end portion of a C-shaped opening 118 provided in the flange portion 59. The ends of the C-shaped opening 118 provide two different anchor locations 119 and 120 on the flange portion 59 for the anchor portion 116 of the spring 114 and the action of this spring on the locking lever 81 will depend upon which of the anchor locations 119 and 120 the anchor portion 116 is disposed in.

The C-shaped opening 118 is located in the flange portion 59 so that it is centered on a radial line extending through the pivot axis 121 provided by the pin 82 and the anchor locations 119 and 120 lie on opposite sides of this center line. The anchor portion 115 of the spring 114 lies on a radial line which extends through the pivot axis 121 and occupies the location 122^a when the locking lever 81 is in its unlocking position as shown in Figs. 9 and 10. The anchor portion 116 of the spring lies on a radial line 123 when it is engaged in the anchor portion 119 of the C-shaped opening and lies on a radial line 124 when it is engaged in the anchor portion 120 of the C-shaped opening.

Figs. 9 and 10 of the drawings show the locations described above for the C-shaped opening 118 and the anchor portions 115 and 116, and also illustrate somewhat diagrammatically the action of the spring 114 in urging the locking lever 81 toward its locking and unlocking positions. In Fig. 9 the anchor portion 116 of the spring 114 is engaged in

the anchor location 119 of the C-shaped opening and in Fig. 10 the anchor portion 116 is shown as having been manually shifted to the anchor location 120.

5 When the locking lever 81 is in its unlocking position in which it is shown in full lines in Figs. 7, 9 and 10, the shoulder 94 thereof will lie opposite the support arm 84^a when the latter is being held in its lowered position of Fig. 6 by reason of the holding portion 68^a of the detent lever 65 being then in engagement with the relatively high cam portion 63^d adjacent the tooth 63^c of the ratchet member 63 in contrast to the relatively low cam portion adjacent the tooth 63^a thereof. The latch device 15 is, at this time, in its door-unlatched condition which is the case when the door 11 is in its open position.

10 It is desirable that locking of the latch device 15, either by manipulation of the key-actuated lock 97 or by means of the garnish molding knob 107 of the inside control means, be prevented whenever the door is in its open position. As shown in Figs. 6 and 7, the support arm 84^a lies opposite the shoulder 94 when the latch device 15 is in its door-unlocked and door-unlatched condition and will then be engageable by this shoulder as the result of any attempt to lock the latch device, while it is in such unlocked and unlatched condition, and will prevent the locking lever from swinging fully to its locking position.

15 When such an attempt is made to lock the latch device 15 while the mechanism is in its door-unlatched condition, the swinging movement of the locking lever 81 will come to a stop with the shoulder 94 pressing against the support arm 84^a. If the latch device 15 is allowed to remain in this condition there is a possibility that, upon slamming of the door to its closed position and the resulting lifting of the support arm 84^a by the action of the spring 111, the locking lever 81 may continue its movement toward its locking position and assume a full locking position with the support arm 84^a engaged in the notch 95. Such a continued movement of the locking lever 81 to its full locking position under the circumstances explained just above would result in vehicle operator unintentionally locking himself out of the vehicle.

20 When the anchor portion 116 of the spring 114 is located in the anchor position 119 as shown in Fig. 9 of the drawings, the action of this spring will be to always tend to swing the locking lever 81 toward its unlocking position rather than toward its locking position upon the occurrence of the above-described upward movement of the support arm 84^a, at a time when the shoulder 94 is pressing against the latter. That the spring 114 will always tend to thus swing the locking lever 81 towards its unlocking position under these circumstances and as the result of the

anchor portion 116 being engaged in the anchor location 119, is apparent from Fig. 9 of the drawings from which it will be seen that when the shoulder 94 is in pressing engagement with the support arm 84^a, the anchor portion 115 will have been shifted only to the position 115^a represented by the line 122^b which still lies on the left side of the radial line 123 of the anchor location 119. Therefore, upon movement of the arm 84^a out of its blocking position in front of the shoulder 94, the expansive action of the spring 114 tending to spread the anchor portions 115 and 116 apart will, under these circumstances, result in an actuating force being applied to the locking lever 81 whose direction is such that it will cause a clockwise swinging of the locking lever, whereby this lever will be automatically returned to its full-line unlocking position shown in Fig. 9.

On the other hand when the anchor portion 116 of the spring 114 has been shifted to the anchor location 120 as shown in Fig. 10, and the locking lever 81 is in the position with its shoulder 84 pressing against the support arm 84^a, the corresponding position 115^b of the anchor portion 115 as represented by the line 122^a will then lie on the right side of the radial line 124. The expansive action of the spring tending to spread the anchor portions 115 and 116 apart will now result in an actuating force being applied to the locking lever 81 whose direction is such as to cause a counterclockwise swinging of the locking lever. Therefore when the anchor portion 116 of the spring 114 has been shifted to the anchor location 120 as shown in Fig. 10, the action of this spring will always be to produce counterclockwise swinging of the locking lever upon lifting of the support arm 84^a while the shoulder 94 is pressed against the latter, and consequently, the latch mechanism 15 will operate as a self-locking mechanism when the door 11 is swung to its closed position under these circumstances.

By the provision of the C-shaped opening 118 in the flange portion 59 it will therefore be possible to convert the latch device 15 from a self-locking mechanism to a non-self-locking mechanism and vice versa, merely by the shifting of the anchor portion 116 from one to the other of the anchor locations 119 and 120.

Figs. 11 to 14 inclusive show a door latch device 125 which is similar to the latch device 15 and intended for use with a keeper 14 but in which certain structural and functional differences occur. In the modified latch device 125 a latch member 126 is used having the form of a gear member provided with peripheral teeth, in this case five such teeth. The ratchet member 127 of the latch device 125 is in the form of a ratchet wheel having peripheral teeth comprising main ratchet teeth 128 and intervening auxiliary teeth 129, in

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this case five teeth each for such main and auxiliary ratchet teeth. The ratchet wheel 127 is also provided with full-depth notches or tooth recesses 130 adjacent the main ratchet teeth 127 and shallow-depth notches or tooth recesses 131 adjacent the auxiliary ratchet teeth 129. To the extent that portions or elements of the latch device 125 are the same as in the latch device 15, the same reference numerals have been applied thereto.

Another important difference in the modified latch device 125 is that, the detent means 133 thereof comprising a detent lever 134 lies adjacent the plate portion 58 of the support 57 and the control member 78 is connected between the locking lever 136 and a detent release lever 135. The support arm 84^a with which the locking lever 136 co-operates is, in the modified latch device 125, carried by the detent release lever 135 instead of by the detent lever as is the case in the latch device 15.

The detent lever 134 and the detent release lever 135 are both in the form of bell crank levers swingably supported by a common pivot pin 67. The detent lever 134 comprises a detent arm 138 having a holding portion 138^a engageable with the ratchet wheel 127 and a control arm 139 having, at the free end thereof, a thrust portion in the form of a finger 140 whose purpose will be described hereinafter. The detent release lever 135 comprises an arm 141 having a contact portion 141^a engageable by the push button stem 73 and a control arm 142 lying adjacent the control arm 139 and disposed in a spaced and substantially parallel relation to the latter. The support arm 84^a and the control arm 142 are provided with substantially aligned openings 143, 144 in which the fingers 80 and 79 of the control member 78 are shiftably received.

The locking lever 136 is similar to the above-described locking lever 81 and includes an actuating bracket 85 in whose opening 91 the stem portion 78^a of the control member 78 is slidably received. The locking lever 136 differs, however, from the locking lever 81 in that the shoulder 94 has been omitted therefrom and in that it is provided with a thrust shoulder 145 which does not occur in the locking lever 81.

A wire spring 147 having a coiled portion disposed in surrounding relation to the pivot pin 67 applies a clockwise swinging force to the detent release lever 135 tending to swing this lever toward its retracted position. A tension spring 148 is connected between an anchor lug 149 of the plate portion 58 and the free end of the detent arm 138 and applies a clockwise rotative force to the detent lever 134 tending to swing the same in a direction to engage the holding portion 138^a in one of the tooth recesses of the ratchet member 127.

Fig. 11 of the drawings shows the latch

member 126 in its door-latched position at which time the tooth 126^a thereof is fully engaged in the pocket 44 of the keeper 14 and lies substantially on the vertical center line 150 which passes through the pivot axis of the latch member when the latter is in its door-locked position. At this time, the latch member 126 is retained in such door-latched position by the engagement of the holding portion 138^a of the detent lever 134 in one of the full-depth tooth recesses 130 of the ratchet member 127.

Fig. 12 of the drawings shows the latch member 126 in its safety-latched position at which time the tooth 126^a of the latch member is in a partially-engaged position in the pocket 44. At this time, the holding portion 138^a of the detent lever 134 is engaged in one of the shallow depth tooth recesses 131 of the ratchet member 127.

From the construction described above for the modified latch device 125 it will be seen that when the locking lever 136 is in its locking position in which it is shown in full lines in Fig. 13, the control member 78 will occupy a position in which the finger 79 thereof is in its retracted ineffective location. At this time the detent release lever 135 will be swingable in an idle free-wheeling condition because the finger 79 will not become engaged with the control arm 139. Under these circumstances the detent lever 134 will not be swingable by the detent release lever 135, and consequently, will remain in holding engagement with the ratchet member 127 and the latch device 125 will then be in its locked condition.

When the locking lever 136 is swung to its unlocking position 136^a in which it is shown in phantom lines in Fig. 13, the control member 78 will be shifted by the locking lever to project the finger 79 so that the latter will extend transversely of the control arm 139 and will engage the latter when the detent release lever 135 is actuated by the push button stem 73. The actuation of the control arm 139 by the finger 79 will cause the holding portion 138^a of the detent arm 138 to release the ratchet member 127 to permit door-unlatching movement of the latch member 126.

The thrust finger 140 which, as mentioned above, is formed by the free end of the control arm 139 is engageable with the thrust shoulder 145 of the locking lever 136 for producing automatic swinging of the latter to its unlocking position whenever the vehicle door 11 is swung to its closed position while the locking lever happens to be in its locking position. This co-operation of the thrust finger 140 with the thrust shoulder 145 thus produces an automatic unlocking of the latch device 125 which will prevent the operator from locking himself out of the vehicle by a

closing of the door while the latch device happens to be in its locked condition.

The engagement of the thrust finger 140 with the shoulder 145 to produce this automatic unlocking action is by a counterclockwise swinging of the detent lever 134 produced by a forced rotation of the ratchet member 127 as the result of the co-operation of the latch member 126 with the keeper 14. Thus, if the latch device 125 is actuated to a locked condition while the door 11 is standing open, a subsequent movement of the door to its fully-closed position will result in a forced counterclockwise rotation of the ratchet member 127 and a camming action thereof against the holding portion 138^a. The resulting counterclockwise swinging of the detent lever 134 will cause the thrust finger 140 to apply the above-mentioned kick-out action against the thrust shoulder 145 and thereby automatically swing the locking lever to its unlocking position 136^a.

From the accompanying drawings and the foregoing detailed description it will now be readily understood that this invention provides novel door control mechanism of a simple and practical form and in which a detent release lever will have an effective action, or a free-wheeling idle action, relative to an associated detent lever depending upon whether a control member shiftable by the locking member of the mechanism is in an effective or ineffective position. Since the various other novel features and the new and improved results produced by the door control mechanism of this invention have already been explained hereinabove, they need not be further summarized at this point.

WHAT I CLAIM IS:—

1. Door control mechanism comprising: a support adapted for mounting on a door; latch means pivoted on said support and movable to and from a door-latched position; detent means effective on said latch means for releasably retaining the latter in said door-latched position and including a swingable first arm; a detent release member pivoted on said support and including a swingable second arm adjacent said first arm; a locking member shiftable mounted on said support for movement to locking and unlocking positions; and control means connected with said locking member and having a control portion extending transversely to one of said arms; said control means being shiftable by said locking member for moving said control portion to effective and ineffective control positions; said detent release member having an idle movement relative to said detent means when said control portion is in said ineffective position and the other of said arms being engageable with said control portion, when the latter is in said effective position, for rendering said detent means actuatable by said detent release member.

2. Door control mechanism as defined in Claim 1 wherein said one arm is provided with an opening through which said control portion projects so as to extend into the path of movement of said other arm when said control portion is in said effective position.

3. Door control mechanism as defined in Claim 1 wherein said first and second arms are swingable about a common pivot axis and in substantially parallel planes, and wherein said one arm is provided with an opening in which said control portion is confined for the transverse shifting movement thereof; said engagement between said control portion and said other arm being with an edge portion of the latter.

4. Door control mechanism as defined in any of Claims 1 to 3 wherein said one arm comprises spaced arm portions having substantially aligned openings therein; and wherein said control portion extends through said aligned openings.

5. Door control mechanism as defined in Claim 4 and wherein said control means comprises a center portion connected with said locking member, and finger portions extending in opposite directions on opposite sides of said center portion and projecting into said openings.

6. Door control mechanism as defined in any of Claims 1 to 5 wherein the connection between said control means and locking member comprises relatively slidably co-operating connecting portions on said control means and locking member.

7. Door control mechanism as defined in any of Claims 1 to 4 wherein said control means has a stem portion and said locking member has an apertured portion; and wherein the connection between said control means and locking member is formed by a slidable engagement of said stem portion in said apertured portion.

8. Door control mechanism as defined in Claim 5 wherein said locking member has an apertured portion and said center portion of the control member is a stem portion slidably received in said apertured portion; and wherein said finger portions are rigid with said stem portion.

9. Door control mechanism as defined in Claims 7 or 8 wherein the apertured portion of said locking member is a bracket means.

10. Door control mechanism as defined in any of the preceding claims wherein said locking member is pivoted on said support for swinging to said locking and unlocking positions.

11. Door control mechanism as defined in any of the preceding claims and wherein said one arm is a part of said detent means and said other arm is a part of said detent release member.

12. Door control mechanism as defined in any of Claims 1 to 10 wherein said one arm

is a part of said detent release member and said other arm is a part of said detent means.

13. Door control mechanism as defined in Claims 11 or 12 wherein said control means is shiftably supported by said one arm for actuation by said locking member to cause movement of said control portion to its effective and ineffective positions by movement of said control portion transversely of said one arm and into and out of the path of movement of said other arm.

14. Door control mechanism as defined in any of Claims 1 to 11 wherein said locking member includes a blocking means movable to blocking and unblocking positions relative to said one arm in response to shifting of said locking member to its locking and unlocking positions; said blocking means, when in said blocking position, being effective to prevent a release actuation of said detent member by the idle movement of said detent release member.

15. Door control mechanism as defined in Claim 12 wherein said latch means comprises a latch member and a ratchet member connected therewith and engaged by a detent member of said detent means, and said locking member includes a thrust portion; and wherein said first arm is carried by said detent member and includes an extension portion engageable with said thrust portion for automatically moving said locking member to its unlocking position upon actuation of said detent member in response to a forced pivotal movement of the ratchet member by said latch member.

16. Door control mechanism as defined in Claim 15 wherein said latch member is a gear wheel and said ratchet member is a toothed ratchet wheel having full-depth and shallow-depth tooth recesses; and wherein the engagement of said detent member in one of said shallow-depth tooth recesses provides a safety-latch position for said latch member.

17. Door control mechanism as defined in Claims 1 to 11 and 14 wherein said latch means comprises a latch member, and a ratchet member connected with said latch member for pivotal movement therewith on a common pivot axis and having low-cam and high-cam portions engageable by a detent member of said detent means for retaining said latch

member in door-latched and door-unlatched positions; said one arm occupying a blocking position relative to said locking member and being engageable by the latter when said high-cam portion is engaged by said detent member, to thereby prevent movement of said locking member to its locking position while said latch member is in its door-unlatched position.

18. Door control mechanism as defined in Claim 17 and having an over-centre type spring effective on said locking member, and connecting means connecting said spring with said support and providing two different settings for said spring; said spring acting to continuously bias said locking member toward its locking or unlocking position in accordance with the selection of one or the other of the spring settings.

19. Door control mechanism as defined in Claims 10 and 18 wherein said connecting means comprises a C-shaped slot in said support and located in straddling relation to a median line passing through the pivot axis of the locking member, and an end anchor portion on said spring and engaged in one of the end portions of said slot.

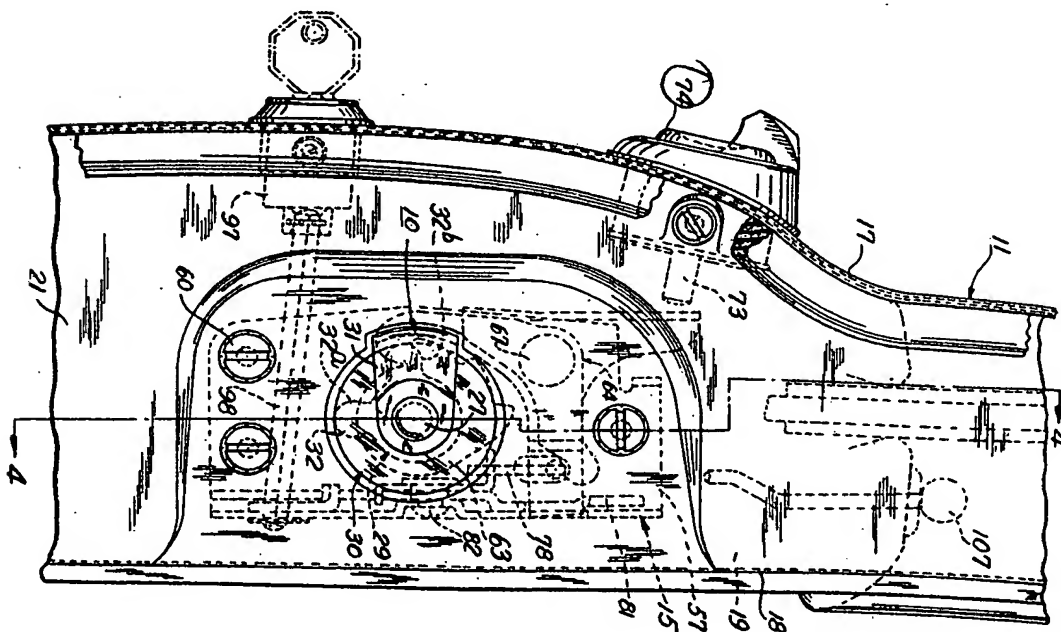
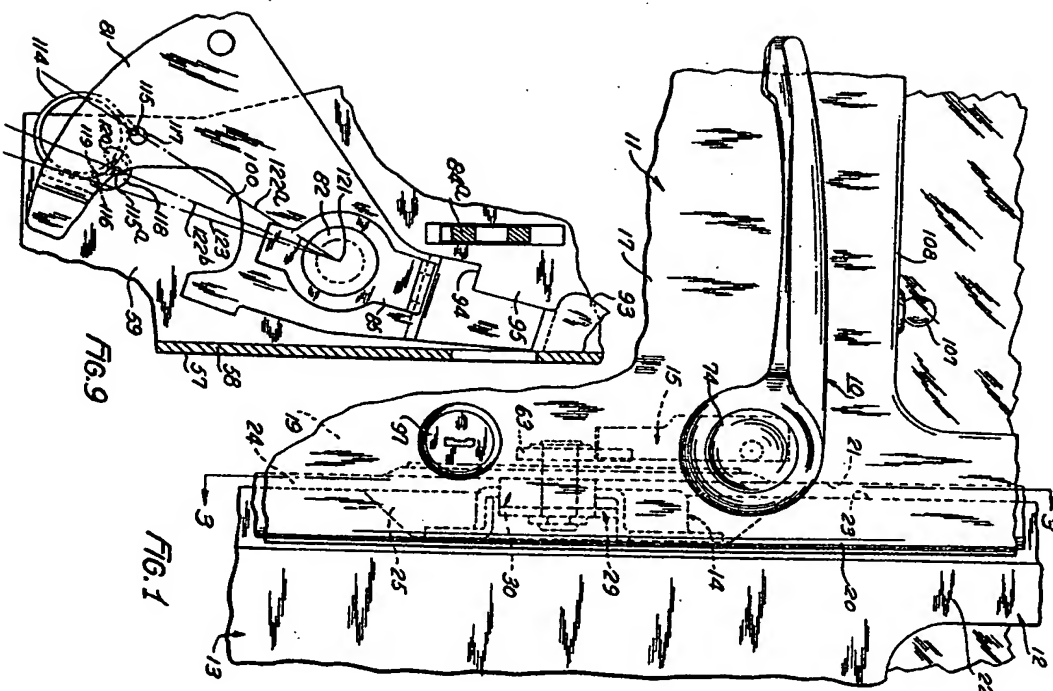
20. Door control mechanism as defined in any of Claims 17, 18 or 19 wherein said detent member and said detent release member are levers swingable on a common pivot offset from the common pivot axis of said latch member and ratchet member; and wherein a single spring connected between said levers and the latter two members biases said levers and latter members all in the same rotative direction.

21. Door control mechanism as defined in Claim 20 wherein the detent lever has a holding arm engageable with said ratchet member, and the detent release lever has a thrust arm engageable with said holding arm; and wherein said latch member and ratchet member are connected by a shaft having an offset anchor portion, and a single tension spring has the opposite ends thereof attached to said thrust arm and anchor portion.

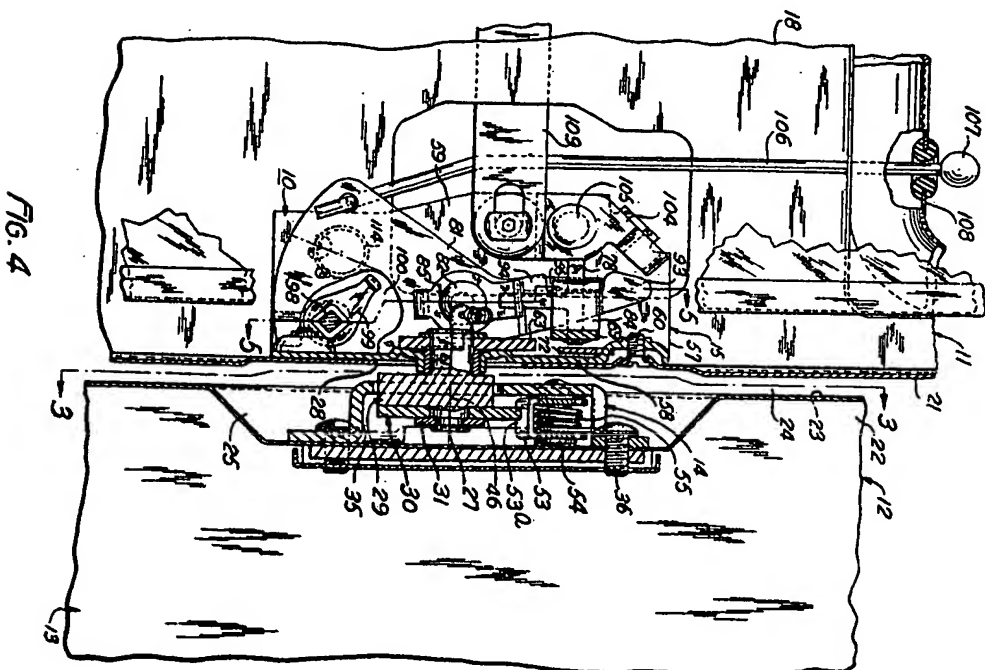
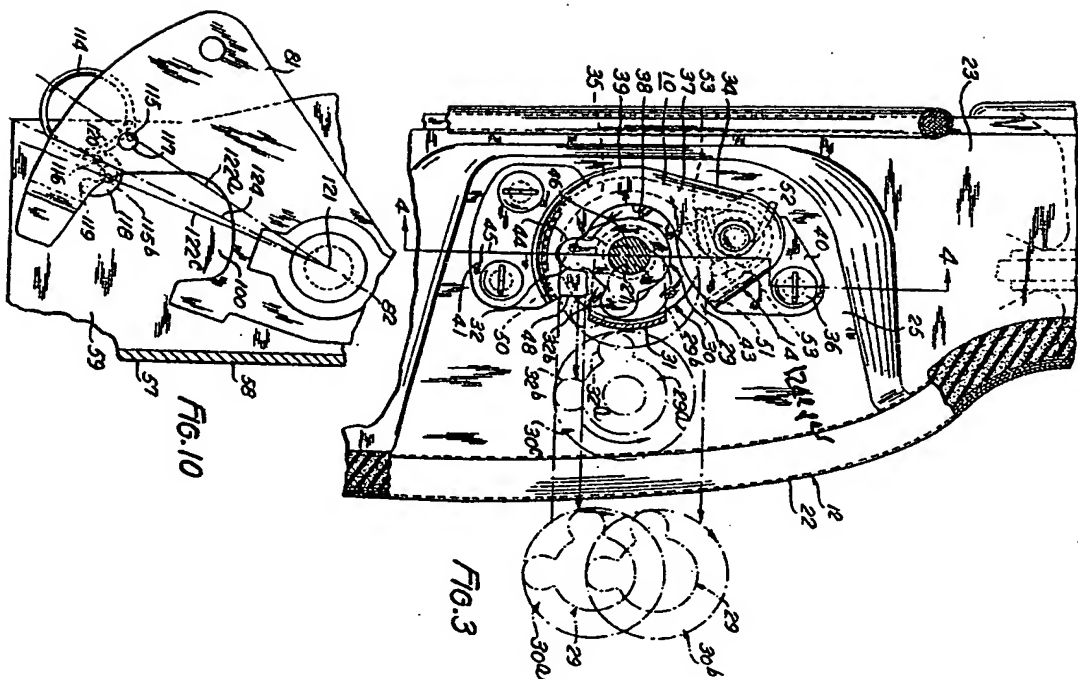
22. Door control mechanism as hereinabove described and as shown in the accompanying drawings.

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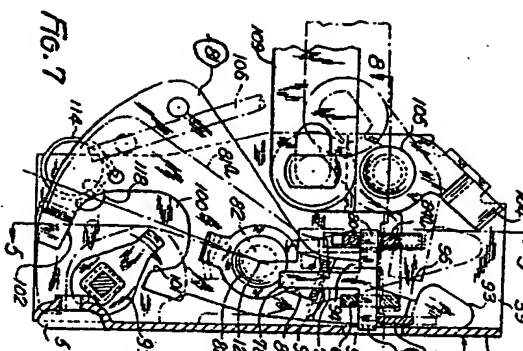
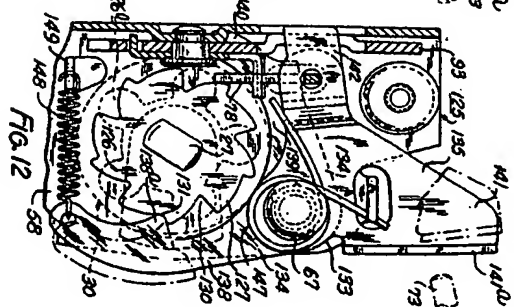
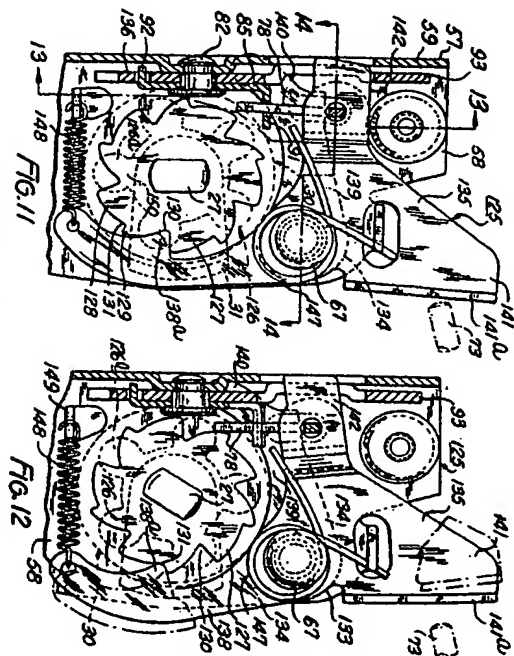
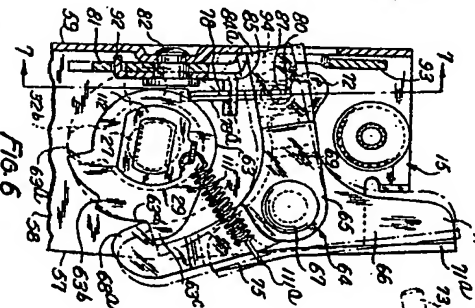
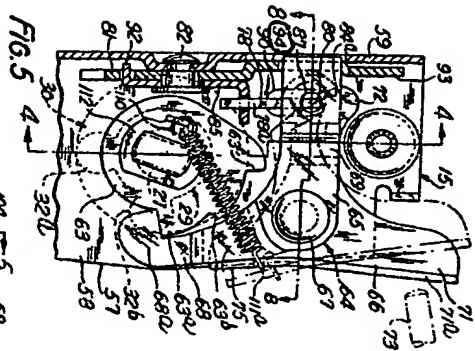
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6 SHEETS
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INVESTOR IN PEOPLE

Application No: GB 0105120.0
Claims searched: 1-24

Examiner: Philip Silvie
Date of search: 2 July 2001

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): E2A (AARN)

Int Cl (Ed.7): E05B (65/20, 65/32)

Other: Online: WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 0 900 677 A (MENZIMER) see page 4, line 124 to page 5, line 11	1-3,6-9,11,18,19 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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